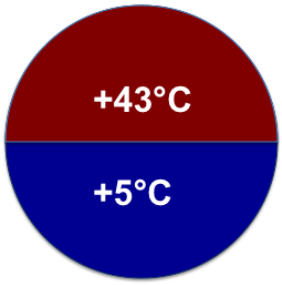
SunDanzer DC-Powered Refrigeration



User's Guide for the SunDanzer BFRV55

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INTRODUCTION

Before using the appliance, read through this manual carefully including all the information on safety, installation, operation, and cleaning. These guidelines do not cover every possible condition or situation that may occur. Be safe using common sense and caution when installing, operating and cleaning this appliance. If you are unsure about any of these instructions or warnings, contact SunDanzer or your local product dealer for assistance.

TABLE OF CONTENTS

Content	Pages
Important Notes	1
Important Safety Instruction	2-3
Installation	3
Electrical DC Connection	3-4
Operation	4-6
Cleaning	6
Hints & Tips	6
Trouble Shooting	7
Warranty	8

IMPORTANT NOTES

- **THIS APPLIANCE SHOULD BE LEFT OFF IN ITS NORMAL OPERATING POSITION FOR 2 HOURS PRIOR TO TURNING IT ON TO ALLOW THE COMPRESSOR OIL TO SETTLE.**
- **IF THE APPLIANCE HAS BEEN HANDLED ON ITS SIDE OR STANDING ON END, IT SHOULD BE ALLOWED TO SIT IN THE NORMAL OPERATING POSITION FOR 12 HOURS BEFORE TURNING IT ON.**
- **PRIOR TO ADDING VACCINE LOAD, THIS APPLIANCE SHOULD BE RUN FOR AT LEAST 7 DAYS ALLOWING THE INERIOR OF THE CABINET TO COOL.**
- **THIS APPLIANCE OPERATES ON 12 VOLT DC (DIRECT CURRENT) ONLY! DO NOT CONNECT DIRECTLY TO AN AC (ALTERNATING CURRENT) POWER SOURCE.**
- **NEVER USE EXCESSIVE FORCE ON THE HANDLE TO OPEN THE LID.**

If the appliance operates for extended periods in a room/ambient temperature exceeding 5°F (-15°C) or 113°F (45°C), there is risk of damage to vaccines.

IMPORTANT SAFETY INSTRUCTIONS

These warnings are provided in the interests of your safety. Please ensure that you understand them all before installing or using this appliance. Your safety is of paramount importance. If you are unsure about any of these meanings or warnings, contact SunDanzer or your local product dealer for assistance.

Prior to Installation

- At the delivery, please check that the appliance is complete and has not been damaged during transport. It is not advised to connect an appliance that has been damaged, especially damage to the electrical supply cable or refrigerant circuit. In the event of damage please contact SunDanzer or your local product dealer for assistance

General Safety

- Before cleaning or repositioning the appliance, always disconnect from the electrical power supply.
- Service the appliance only if you are a trained or authorized refrigeration technician.
- This appliance contains refrigerant R-134a and a polyol-ester compressor oil in its refrigerant circuit.
- Take utmost care when handling your appliance so as to not cause damage to the refrigerant circuit with consequent possible leakage.
- Do not use other electrical appliances (such as ice cream makers) inside of the refrigerating appliance

Child Safety

- There is a **DANGER OF SUFFOCATION** if a child becomes trapped inside!
- Keep children from playing in, on, or around this appliance.
- When the unit is not in use, please secure or remove the lid to prevent children from playing inside the cabinet.
- Keep children away from the packaging material. **DANGER OF SUFFOCATION!**

Installation

- This appliance is heavy. Care should be taken when moving it.
- **This appliance operates on 12 Volts DC (Direct Current) only!**
- **Under no circumstances should this appliance be directly connected to an AC (Alternating Current) power source.**
- Be sure that the appliance does not stand on the electrical supply cable. Also, be sure the electrical cable is not squeezed or bent when the appliance is being installed or moved.
- Installation work and adjustments on the appliance must be carried out by qualified personnel only. Work performed by persons with inadequate technical knowledge may adversely effect the performance of the appliance, causing damage to the equipment, and void the warranty.
- It is dangerous to make alterations or attempt to modify this product in any way. Product alterations will void the warranty.

During Use

- **This appliance is designed for medical use only!** Specifically for the storage vaccines. This appliance is not designed for domestic or industrial use. Do not store food or drink inside vaccine refrigerator.
- Do not store any containers with flammable vapors or liquids in or around the appliance, such as organic solvents, spray cans, gas cans, etc. **Danger of explosion!**

Cleaning

- Before cleaning always disconnect from the electrical power supply.

Servicing

- This product should be serviced by an authorized technician and only genuine spare parts should be used.
- Under no circumstances should you attempt to repair the appliance yourself. Repairs carried out by inexperienced persons may cause injury or serious malfunctioning of the appliance. Unauthorized work may void the warranty.

At the end of the appliance life

This symbol indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product. In addition, when disposing of your appliance, the refrigerant must be completely drained and collected by an authorized technician for recycling prior to disposal. Check with your local Environmental Agency for recommendations on recycling this appliance in your area.

INSTALLATION

Unpacking and Cleaning

Remove all packaging and securing tapes from the appliance. To avoid injury and causing damage to the appliance, be extremely cautious when using sharp or pointed tools to complete this task. **Keep children away from the packaging material. DANGER OF SUFFOCATION!** Wash the inside and outside of the appliance with luke warm water and a mild soap or detergent. Abrasive or corrosive cleaning agents, steel wool, scouring sponges, or chemical cleaning agents should not be used under any circumstances. A sponge, soft brush or towel is recommended. After cleaning, thoroughly rinse and dry. You may want to leave the lid open allowing the compartment to ventilate for 20-30 minutes to get rid of residual odors. Check with your local Environmental Agency for recommendations on recycling packaging materials in your area.

Positioning

The area in which the appliance is to be installed must be relatively cool, dry, and suitably ventilated. The area must be protected against any beating rain and free of abundant dust. To ensure proper function, the appliance must be placed horizontally on a flat, firm, and stable surface resting level on all four supports. The floor must be sufficiently strong enough to support a fully loaded cabinet. Use wood or metal shims to level the appliance if necessary. Do not place the appliance close to heat sources (heater, stove, boiler, chimney, etc.), and avoid prolonged exposure to direct sunlight. This appliance uses the exterior walls to transfer heat from the inside of the cabinet. Ensure that there is adequate space between the appliance and neighboring walls or large objects. **A minimum spacing of 3 inches (7.5cm) is highly recommended.** This will provide sufficient airflow around the appliance resulting in more efficient operation and longer appliance lifetime. Always keep the air vent openings of the compressor housing cover free from dust and obstructions

ELECTRICAL DC CONNECTION

The appliance should be left for 2 hours after positioning before it is turned on, in order to allow the refrigerant oil to settle. If the appliance has been handled standing on its side or on end, it should be allowed to stand in the normal operating position for 12 hours before turning it on.

The appliance does **not** have an on-off switch or disconnect switch. To turn the unit on, simply connect the unit's lead wires to the solar array using the MC4 connectors (provided).

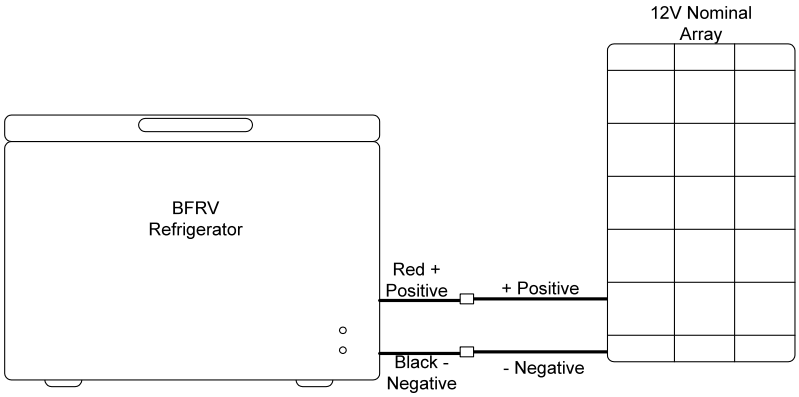
THIS APPLIANCE MUST NEVER BE CONNECTED DIRECTLY TO ANY AC (Alternating Current) POWER SOURCE!

THE APPLIANCE MUST ONLY BE CONNECTED TO A 12V NOMINAL PV ARRAY ONLY.

ATTENTION: Polarity is important in wiring this DC appliance. Be sure that positive terminal of the PV array coincides with the positive wire to the appliance, and the negative terminal of the PV array coincides with the negative wire to the appliance. The leads should be connected using cable shoes and screwed connections. Joined leads should be avoided.

+ to + and − to −
Positive to Positive and Negative to Negative

Electronics Diagram



Fuse
Not required for this application.

ATTENTION: If a longer connection cable is necessary, the cable cross section (or gauge) must be equal to or greater than the cable sizes recommended on the following table. Be careful that the input voltage at the appliance does not drop below the cut-out voltage of the compressor.

Cable Size	**12V Cable Length**		
Area			
mm^2	Gauge	m	ft.
2.5	12	2.5	8
4	12	4	13
6	10	6	19.5
10	8	10	32.8

OPERATION
The SunDanzer refrigerating appliance, like any DC refrigerating appliance, requires care unique from appliances plugged into an electric utility. Prudent operation is the key to extended service.

Starting the Appliance
After the appliance has been properly connected to the 12 VDC power source, the compressor will automatically turn on and the cabinet will begin cooling. **Allow the cabinet to cool for at least 7 day prior to adding vaccine load. This will insure that the appliance has had sufficient time to charge the thermal storage packs.**

Holdover
This unit is equipped with thermal storage packs that provide cooling when the appliance experiences power failure. In the case of power failure it is important to maintain observation of vaccine temperature with the externally mounted thermometer. The following chart gives the approximate time that the internal temperature will remain within the acceptable temperature range if the thermal storage packs begin fully frozen.

Days without Power	Ambient Temperature (°F)	Ambient Temperature (°C)
5	77	25

4	90	32
3	110	43

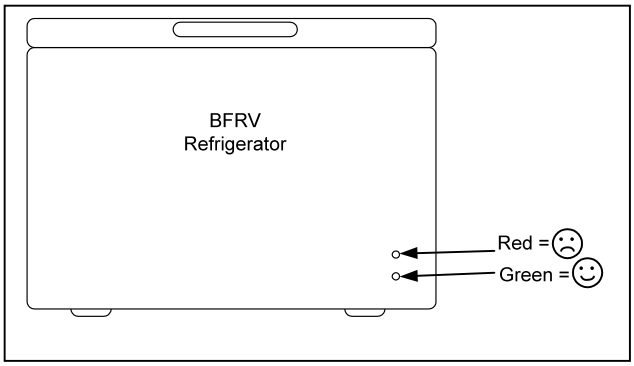
Temperature Control

The temperature within the appliance is controlled by the sensor situated below the perforated aluminum floor. The appliance will automatically detect ambient conditions and select either heating or cooling mode. No temperature adjustment is necessary.

Mode	Ambient Temperature (˚F)	Ambient Temperature (˚C)
Cool	>40	>4.44
Heat	<40	<4.44

Temperature Alarms

A flashing green (bottom) light indicates that the internal temperature is within the acceptable 2°C to 8°C range. The red indicator light (top) will flash and the buzzer will sound every 10 minutes if the internal temperature of the appliance has experienced a period out of the 0°C to 10°C range for longer than 10 minutes. Both green and red flashing lights and the buzzer sounding every 20 minutes indicates that the unit has experienced a short term excursion out of the 2°C to 8°C but within 0°C to 10°C.



Opening and Closing the Lid

To ensure maximum performance of the appliance the lid should remain closed. The lid is fitted with a uniform sealing strip to prevent warm air and moisture from entering the appliance compartment. Be sure that the lid and the lid seal is free from obstructions and forms a complete seal around the rim of the cabinet. The external thermostat wire is designed to be shut in the lid and will not effect performance. Overfilling and/or unlevel installation of the appliance will prevent a good seal.

NEVER USE EXCESSIVE FORCE ON THE HANDLE TO OPEN THE LID!

When the lid is opened, the air inside the appliance becomes slightly warmer and expands. When the lid is closed again, the air is cooled quickly and contracts. This may lead to the creation of a vacuum which makes it more difficult to open the lid again immediately. This is quite normal. Wait for a few moments until the vacuum has equalized and then open gently. Also, ensure that the cabinet is not locked.

Loading Appliance

- **Before adding vaccine be sure that the internal temperature is within the acceptable range of 2°C to 8°C, indicated by the green flashing light**.
- Allow the cabinet to cool for at least 7 days after initial turn on prior to adding vaccine load. This will insure that the appliance has had sufficient time to charge the thermal storage packs.
- **Do not place any vaccine above the marked maximum fill line.**

Baskets

Stackable baskets are provided with this appliance.

CLEANING

Defrosting
Defrosting is not necessary for this appliance.

Internal Cleaning
Wash the inside of the appliance with luke warm water and a mild soap. Never use abrasive or corrosive cleaning agents, steel wool, scouring sponges, chemical cleaning agents, or highly perfumed cleaning products to clean the interior as these will damage the surface and leave behind a strong odor. A sponge, towel, or soft brush is recommended. Washing with a mixture of two table spoons of baking soda to 1 quart (1.14L) warm water. After cleaning, thoroughly rinse and dry.

External Cleaning
Wash the outside of the cabinet with warm water and a mild soap or detergent. Do not use abrasive or corrosive cleaning agents, chemical cleaning agents, steel wool or scouring sponges to complete this task as it may cause damage to the surfaces.

HINTS & TIPS

Normal Operating Sounds
- You may hear faint gurgling or bubbling sounds when the refrigerant is pumped through the refrigerant coils.
- When the compressor is on, the refrigerant is being pumped around and you will hear a whirring sound or pulsating noise from the compressor.
- If the internal temperature is out of the acceptable temperature range a buzzer will sound (see Temperature Alarms)

Energy Saving Advice
- Do not install the appliance close to sources of heat, such as a stove, boiler, heater, chimney, etc, and avoid exposure of the appliance to direct sunlight.
- Locate the appliance in a cool well-ventilated room and make sure that the air vents of the compressor housing cover are not obstructed. Also allow adequate spacing around the cabinet for air circulation (3in. or 7.5cm)
- Always keep vaccines stored in tightly sealed packaging or containers, and allow some space for air to circulate around each item.
- Avoid keeping the lid open for extended periods of time or opening the lid too frequently as warm air will enter the cabinet and cause the compressor run unnecessarily often.

TROUBLESHOOTING

Before contacting a service technician, SunDanzer or your local product dealer, check the following points. If you call out a technician to a fault listed below, or to repair a fault caused by misuse, abuse, or faulty installation, a charge will be made even if the appliance is under warranty.

SYMPTOM	SOLUTION
Appliance connected to power, but does not operate	• Check if 12 VDC is present at the appliance. If not check all system connections and the system. • Check that the polarity is correct "+" is connected to "+" and "–" to "–".
Appliance is operating, but the interior is not cold.	• Allow the appliance at least 7 days from initial turn-on to become cold. •Check that the room/ambient temperature is not exceeding the rated temperature range of 5 ^{o}F (-15 ^{o}C) to 113^{o}F (45^{o}C) •Does the cabinet have adequate ventilation around the side walls allowing it to transfer heat properly? (See Installation Section).
The lid will not open.	• Ensure that it is not locked. • Has the lid just been opened? If so leave for a few minutes to allow the air pressure to equalize and try again. • DO NOT USE EXCESSIVE FORCE ON THE HANDLE TO OPEN THE LID!
Noise	• Refer to 'Normal Operating Sounds'
Red light flashing	The internal temperature of the appliance has experienced a period out of the 0°C to 10°C range for longer than 10 minutes.
Red and green light flashing	The internal temperature of the appliance has experienced a period out of 2°C to 8°C but within 0°C to 10°C for longer than 10 minutes.

CUSTOMER RESPONSIBILITIES

The following items are the responsibility of the customer and are not covered in the warranty:

- Proper care and use of the appliance as described in this manual.
- Damage to the interior or exterior finish or components after delivery.
- Proper power supply, wiring, and connections.
- Service required as a result of alteration, misuse, abuse, flooding, fire, lightning, or acts of God.

SPARE PARTS

The following items are provided:

- Compressor- Danfoss BD50.
- Electronic Control Unit- Danfoss 101N0230
- Electronic Control- SunDanzer part no.PCB 3.4
- Condenser fan
- ECU fan
- Interior fan

Parts replacement should be performed only by trained technician.

WARRANTY

SUNDANZER REFRIGERATION WARRANTS, TO THE ORIGINAL OWNER, THAT THIS PRODUCT IS FREE FROM DEFECTS IN WORKMANSHIP AND MATERIAL FOR A PERIOD OF TWO YEARS FROM THE PURCHASE DATE. THIS WARRANTY SHALL BE LIMITED TO REPAIRING OR REPLACING, AT SUNDANZER'S OPTION AND WITHOUT CHARGE TO THE PURCHASER, DEFECTIVE COMPONENTS. ALL WARRANTY WORK SHALL BE PERFORMED AT A SUNDANZER APPROVED FACILITY. SHIPPING CHARGES RELATED TO RETURNING THE PRODUCT TO THE SUNDANZER FACILITY ARE NOT COVERED UNDER THIS WARRANTY. HOWEVER, THIS WARRANTY COVERS SHIPPING CHARGES RELATED TO RETURNING THE REPAIRED PRODUCT TO THE CUSTOMER WITHIN THE CONTINENTAL UNITED STATES. OUTSIDE THE CONTINENTAL UNITED STATES, ALL SHIPPING CHARGES ARE THE RESPONSIBILITY OF THE CUSTOMER AND ARE NOT COVERED BY THIS WARRANTY. THIS WARRANTY DOES NOT APPLY TO DAMAGE OR WEAR TO THE PRODUCT CAUSED BY ACCIDENT, ABUSE, MISUSE, NEGLECT, UNAUTHORIZED ALTERATION OR REPAIR, OR IF THE PRODUCT WAS NOT INSTALLED IN ACCORDANCE WITH SUNDANZER PRINTED INSTALLATION AND OPERATING INSTRUCTIONS. TO OBTAIN SERVICE UNDER THIS WARRANTY, THE DEFECTIVE PRODUCT MUST BE RETURNED TO SUNDANZER TOGETHER WITH A RETURN MATERIAL AUTHORIZATION (RMA) NUMBER. ANY PRODUCT REPAIRED OR REPLACED UNDER THIS WARRANTY WILL BE WARRANTED FOR THE BALANCE OF THE WARRANTY PERIOD WITH RESPECT TO THE ORIGINAL PURCHASED PRODUCT. SUNDANZER REFRIGERATION WILL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSSES, OR EXPENSES ARISING FROM INSTALLATION, USE OR ANY OTHER CAUSES. THERE ARE NO EXPRESS OR IMPLIED WARRANTIES, INCLUDING MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WHICH EXTEND BEYOND THOSE WARRANTIES DESCRIBED OR REFERRED TO ABOVE.

Please have the following Information available.
Model Number:
Serial Number:
Purchase Date:

For warranty claims or additional information, contact:

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